



Proper Operation of A123Racing Hypersonic Developer Kit Summary usage and care guidelines

Handling Precautions

- CAUTION - do not short circuit; these cells are capable very high discharge currents.
- DO NOT rotate the negative tab (cap) relative to the can, this can cause internal damage to the cell.
- Note that the can is the positive terminal and the cap is the negative terminal (see diagram at right).

Specification

Nominal voltage	3.3V
Nominal capacity	2.3Ah
Nominal dimensions	26mm ϕ x 66.5mm ht.
Nominal cell weight	70g

Cell charging parameters: CC-CV (constant current – constant voltage)

Recommended charge current (0°C to 60°C ambient temp):	3A
Recommended charge voltage:	3.6V
Recommended float charge voltage:	3.45V
Recommended cut-off current for CV hold (indicating 100% SOC):	0.05A
Maximum continuous charge current (20°C to 60°C ambient):	10A
Maximum allowable charge voltage:	4.2V MAX
Fast charge time:	15 minutes

Cell discharging parameters (-30°C to +60°C ambient temperature)

Recommended discharge cut-off voltage:	2.0V
Maximum continuous discharge current:	60A

Cell temperature parameters (skin temperature)

Maximum recommended cell temperature:	70°C
Maximum allowable cell temperature:	85°C
Allowable storage temperature range:	-50°C to +60°C

Before joining cells together please read the below instructions:

Cells are shipped at 50% state of charge (SOC). All cells that are being joined together within the same string must be at the same SOC. If not, the string will be unbalanced and cell damage and/or reduced capacity may result. If the SOC of the cells are not known, the best way to be sure a string is balanced is to individually charge each cell to 100% SOC before building them into strings.

Recommended charge method: CC-CV

The cell should be charged at the recommended charge current until the normal charge voltage is reached. Apply a constant voltage hold at the recommended charge voltage until the cut-off current for CV hold is reached (or 30 minutes, whichever comes first). The cell will be charged to 100% SOC.

Recommended float charge method

If the voltage of the cell is to be held at the charge voltage (after reaching 100% state of charge) for prolonged periods of time, the charge voltage should be lowered to the recommended float-charge voltage.

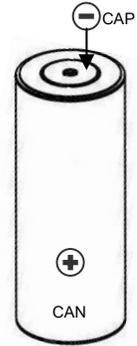
Recommended fast charge method

Charge the cell at the maximum continuous charge current until the maximum recommended charge voltage is reached. Apply a constant voltage hold at the maximum recommended cell voltage until the total charge time reaches the fast charge time. The cell will be charged to over 96% SOC. Fast charge should not be attempted outside the recommended temperature range and should be stopped if the cell exceeds the maximum allowable cell temperature.

Recommended discharge method

For optimum life, the cell should not be continuously discharged faster than the maximum cell continuous discharge current or allowed to self heat greater than the maximum recommended cell temperature. Operation above the max recommended cell temperature will result in degraded cell performance and life. Discharge should be stopped when the cell reaches the maximum allowable cell temperature. Operation above the maximum allowable cell temperature will result in physical damage to the cell. At low temperatures the maximum available discharge current will decrease.

The cell can be discharged at greater than the maximum continuous discharge current in pulses, but the cell should not be allowed to exceed the maximum allowable cell temperature. During pulse discharges the cell voltage can safely fall below 2V per cell. Although it is safe to discharge the cell below the recommended discharge cut-off voltage, the cell should not be left at this level.



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Pack Assembly and Warranty

Recommended assembly method for combining cells into strings:

Series Strings:

Cells can be combined together in "series strings" to achieve higher operating voltages by connecting the positive terminal of one cell to the negative terminal of the next cell. Strings of series cells should be connected together via the solder tabs welded to the cell. Removing the solder tab and soldering directly to the cell will damage it.

Parallel Strings:

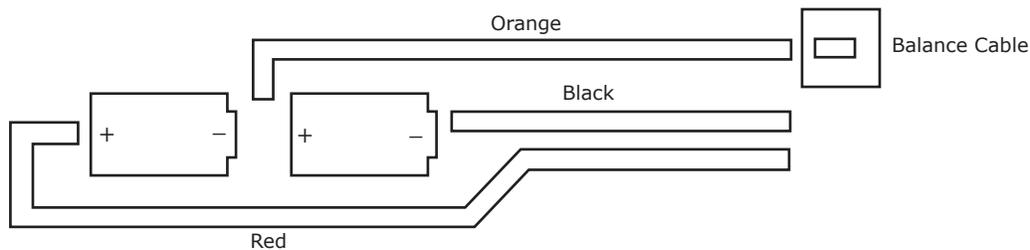
Cells can be combined together in "parallel strings" to achieve higher operating capacities by connecting both the positive and negative terminals of adjacent cells to each other. Strings of parallel cells should be connected together via the solder tabs welded to the cell. Removing the solder tab and soldering directly to the cell will damage it.

Attaching Balance Cable: (optional)

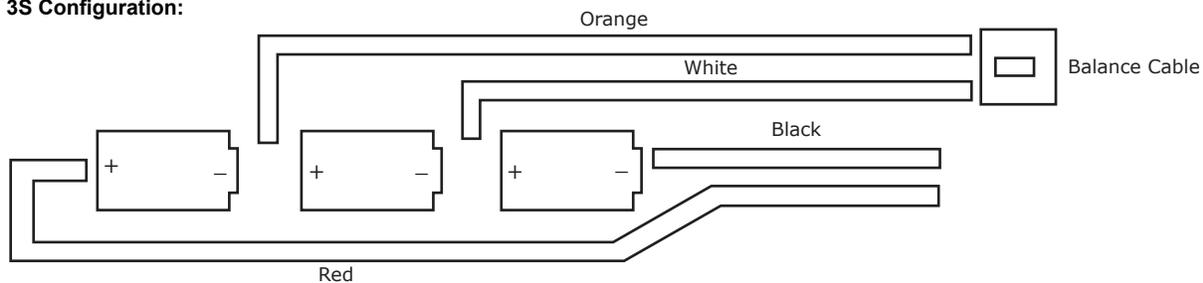
Balancing Cables sold separately as accessories

Balance cables can be attached to your custom configuration when creating 2S (2 batteries in series) and 3S (3 batteries in series) configurations. Please see the illustration below for attaching balance cables to a 2S or 3S pack.

2S Configuration:



3S Configuration:



Safe handling and disposal guidelines

- For optimum life and performance, charge only on Hypersonic™ Sonic Charge™ battery charging system.
- Do not disassemble the battery pack or attempt to solder connections directly to the component cells.
- Keep out of reach of children.
- Do not incinerate, dispose of in fire, or heat above 71°C. Dispose of used batteries in the proper manner.
- Dispose or recycle batteries by wrapping in a plastic bag and placing in regular trash, or check with the Re-chargeable Battery Recycling Corporation at www.rbcc.org for a battery recycling drop-off location near you.
- Hypersonic™ lithium-ion batteries can be charged up to 4.2V per cell without hazard. Once 4.2V per cell is exceeded gas pressure may build up inside the cell and cause a one-time safety vent to open. Should this occur, the battery will be unusable and must be replaced. The damaged battery should then be disposed of in the proper manner.
- Hypersonic™ lithium-ion batteries are inherently safe and do not pose a fire hazard under improper charging conditions, but are capable of very high discharge currents. Take precautions to avoid short circuits; considerable heating will occur through the shorting conductor.

Warranty Policy

- Warranty limited to original manufacturing defects, workmanship of finish and assembly only. Should defects covered by this warranty occur, the product shall be repaired or replaced by A123 Racing.
- Warranty claims must be made in writing and received by A123 Racing within 30 days of purchase. Send claims to:

Hypersonic Lithium Ion Warranty Claims
c/o A123Systems
116 South Street
Hopkinton MA 01748

- Warranty will be void due to inappropriate use of this product, including but not limited to failure to follow usage guidelines, disassembly or tampering, or unauthorized repair; determination of inappropriate usage will be made at the sole discretion of A123 Racing.
- For customer support or technical questions please send email to CustomerSupport@A123Racing.com